WE CLAIM:

1. A searcher for finding the frequency of a received signal comprising a phase error, the searcher comprising:

a frequency locked loop that generates a phase increment signal in response to the phase error of the received signal; and

a programmable rotator coupled to the frequency locked loop, the programmable rotator performing a phase rotation function in response to the phase increment signal.

2. The searcher of claim 1 wherein the programmable rotator is an 8-Phase Shift Keying rotator.

3. The searcher of claim 1 wherein the programmable rotator is a Quadrature Phase Shift Keying rotator.

4. The searcher of claim 1 and further including a phase error accumulator coupled to the phase error signal, the phase error accumulator accumulating phase error signals from the frequency locked loop and generating a control signal that instructs the programmable rotator to perform the phase rotation function.

5. The searcher of claim 4 and further including a shift register coupled between the phase error accumulator and the programmable rotator, the shift register truncating a predetermined number of bits of the control signal.

6. A searcher for finding the frequency of a received signal comprising a phase error, the searcher comprising:

a frequency locked loop that generates a phase increment signal in response to the phase error of the received signal;

a phase error accumulator coupled to the frequency locked loop, the phase error accumulator accumulating a plurality of phase increment signals and generating a control signal in response to the accumulated phase increment signals; and

an 8-Phase Shift Keying programmable rotator coupled to the phase error accumulator, rotator performing a phase rotation function in response to the control signal.

7. The searcher of claim 6 and further including a shift register apparatus coupled between the rotator and the phase error accumulator, the shift register apparatus shifting bits of the control signal a predetermined amount in order to truncate the control signal to a predetermined number of bits.

8. The searcher of claim 6 wherein the phase error accumulator accumulates phase increment signals over a 64-chip interval.

9. The searcher of claim 6 wherein the frequency locked loop further comprises means for generating an initial phase signal that is coupled to the 8-Phase Shift Keying programmable rotator and initializes the rotator to a predetermined starting phase.

10. A searcher for finding the frequency of a received signal comprising a phase error, the searcher comprising:

a frequency locked loop that generates a phase increment signal in response to the phase error of the received signal;

a phase error accumulator coupled to the frequency locked loop, the phase error accumulator accumulating a plurality of phase increment signals and generating a control signal in response to the accumulated phase increment signals; and

a Quadrature Phase Shift Keying programmable rotator coupled to the phase error accumulator, rotator performing a phase rotation function in response to the control signal.

11. The searcher of claim 10 and further including a shift register apparatus coupled between the rotator and the phase error accumulator, the shift register apparatus shifting bits of the control signal a predetermined amount in order to truncate the control signal to a predetermined number of bits.

12. The searcher of claim 10 wherein the phase error accumulator accumulates phase increment signals over a 64-chip interval.

13. The searcher of claim 10 wherein the frequency locked loop further comprises means for generating an initial phase signal that is coupled to the Quadrature Phase Shift Keying programmable rotator and initializes the rotator to a predetermined starting phase.

14. A searcher method for finding a signal having a frequency deviation from an expected frequency, the method comprising the steps of:

initializing the searcher on predetermined frequency bins;

determining a phase error in the signal;

generating a phase increment in response to the phase error;

accumulating the phase increments to generate a total phase increment; and

when the total phase increment has reached a predetermined total phase increment threshold, performing a phase rotation function that is substantially equivalent to the total phase increment.

15. The method of claim 14 and further including the step of resetting the accumulated phase increments after performing the phase rotation function.

16. The method of claim 14 wherein the phase rotation function is a Quadrature Phase Shift Keying function.

17. The method of claim 14 wherein the phase rotation function is an 8-Phase Shift Keying function.

18. The method of claim 14 wherein the total phase increment threshold is substantially equivalent to $\pi/4$ radians.

19. The method of claim 14 wherein the total phase increment threshold is substantially equivalent to $\pi/2$ radians.

20. A base station that communicates with wireless mobile stations, the base station comprising:

a transmitter that modulates and transmits signals from a network; and

a receiver that receives and demodulates received signals, the receiver comprising a searcher that finds the frequency of the received signal, the frequency having a phase error, the searcher comprising:

a frequency locked loop that generates a phase increment signal in response to the phase error of the received signal;

a phase error accumulator coupled to the frequency locked loop, the phase error accumulator accumulating a plurality of phase increment signals to generate a total accumulated phase increment, the phase error accumulator generating a control signal in response to the total accumulated phase increment; and

a programmable rotator coupled to the phase error accumulator, rotator performing a phase rotation function in response to the control signal.

21. The base station of claim 20 wherein the programmable rotator is a Quadrature Phase Shift Keying rotator.

22. The base station of claim 20 wherein the programmable rotator is a 8-Phase Shift Keying rotator.

23. The base station of claim 20 wherein the total accumulated phase increment is $\pi/4$ radians.

24. The base station of claim 20 wherein the total accumulated phase increment is $\pi/2$ radians.